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Immunization with neuraminidase deficient influenza virus is highly immunogenic and non-pathogenic to wild type and immunocompromised mice

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Recombinant influenza viruses are promising viral platforms to be used as antigen delivery vectors. To this aim, one of the most promising approaches consists to generate recombinant viruses harboring partially truncated neuraminidase (NA) segments. To date, all studies have been pointed to safety and usefulness of this viral platform. However, some aspects of the inflammatory and immune responses triggered by those recombinant viruses and their safety to immunocompromised hosts remained to be elucidated. In the present study, we generated a recombinant influenza virus harboring a truncated NA segment (NA-Δ) and evaluated the innate and inflammatory responses and the safety of this recombinant virus to wild type or knock-out (KO) mice with impaired innate (Myd88 KO) or acquired (RAG KO) immune responses. Our results showed that recombinant influenza virus harboring truncated neuraminidase segment abrogated lung and systemic inflammatory response in wild type mice and were completely harmless to KO mice. We also demonstrated that vNA-Δ infection could prevent unbalanced cytokine production that strongly contributes for lung damage in infected mice. In addition, the recombinant influenza virus was able to trigger both local and systemic virus specific humoral and T $CD8^+$ cellular immune responses which protected immunized mice against the challenge with a lethal dose of homologous A/PR8/34 influenza virus. Taking together, our findings indicate that the neuraminidase deficient virus results in mild lung inflammation, induces a strong protective immunity against influenza challenge and are safe even to immunocompromised hosts.

Biography

Alexandre Vieira Machado is graduated in Pharmaceutical Sciences by Federal University of Minas Gerais (UFMG), Brazil (1994), where he also obtained his master degree in Microbiology (1998). Further, he obtained his PhD in Microbiology at Pasteur Institute, Paris, France, where he started his studies about the reverse genetics of influenza A virus, mostly focusing on development of recombinant influenza viruses as antigen delivery vectors against human and veterinary diseases. He is currently Associated Researcher at Oswaldo Cruz Foundation, Brazil and his studies are mainly focused on the development of vaccines against protozoan disease using influenza vectors and inflammatory responses triggered by influenza virus.

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